PAN-PACIFIC ENTOMOLOGIST
65(3), 1989, pp. 312–318

A New Species of *Pison* Jurine from Baltic Amber (Hymenoptera: Sphecidae)

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Abstract.—*Pison electrum,* a new species from Baltic amber characterized mainly by a notched mandible and second recurrent vein ending on submarginal cell III, is not closely related to any of the extant species.

Two species of fossil *Pison* are currently known: *cockerellae* Rohwer, 1908, from the shale beds of Florissant, Colorado, and *oligocenum* Cockerell, 1908, from Baltic amber (synonym: *Pison oligocaenum* Cockerell, 1909). A third species, also from Baltic amber, is described below. All three are approximately the same age, Lower Eocene to Lower Oligocene (Florissant shale beds, once thought to be Miocene, are now regarded as Lower Oligocene; see Wilson, 1978, for further references). Alexander Antropov studied the holotype of *cockerellae,* but the holotype of *oligocenum,* presumably lost with most of the Königsberg collection at the end of World War II, was not available. The morphological terminology follows Bohart and Menke (1976), but the upper and lower interocular distances as well as ocellocular distance are defined as in Menke (1988:9). The mandibular terms are based on Michener and Fraser (1978):

adductor ridge: starts at the adductor swelling near the mandibular base (on the concave face) and extends toward the mandibular apex; in *Pison,* it becomes visible on the outer surface before the mandibular midlength, extends almost to the apex, and constitutes the posterior margin between the convex and concave faces;

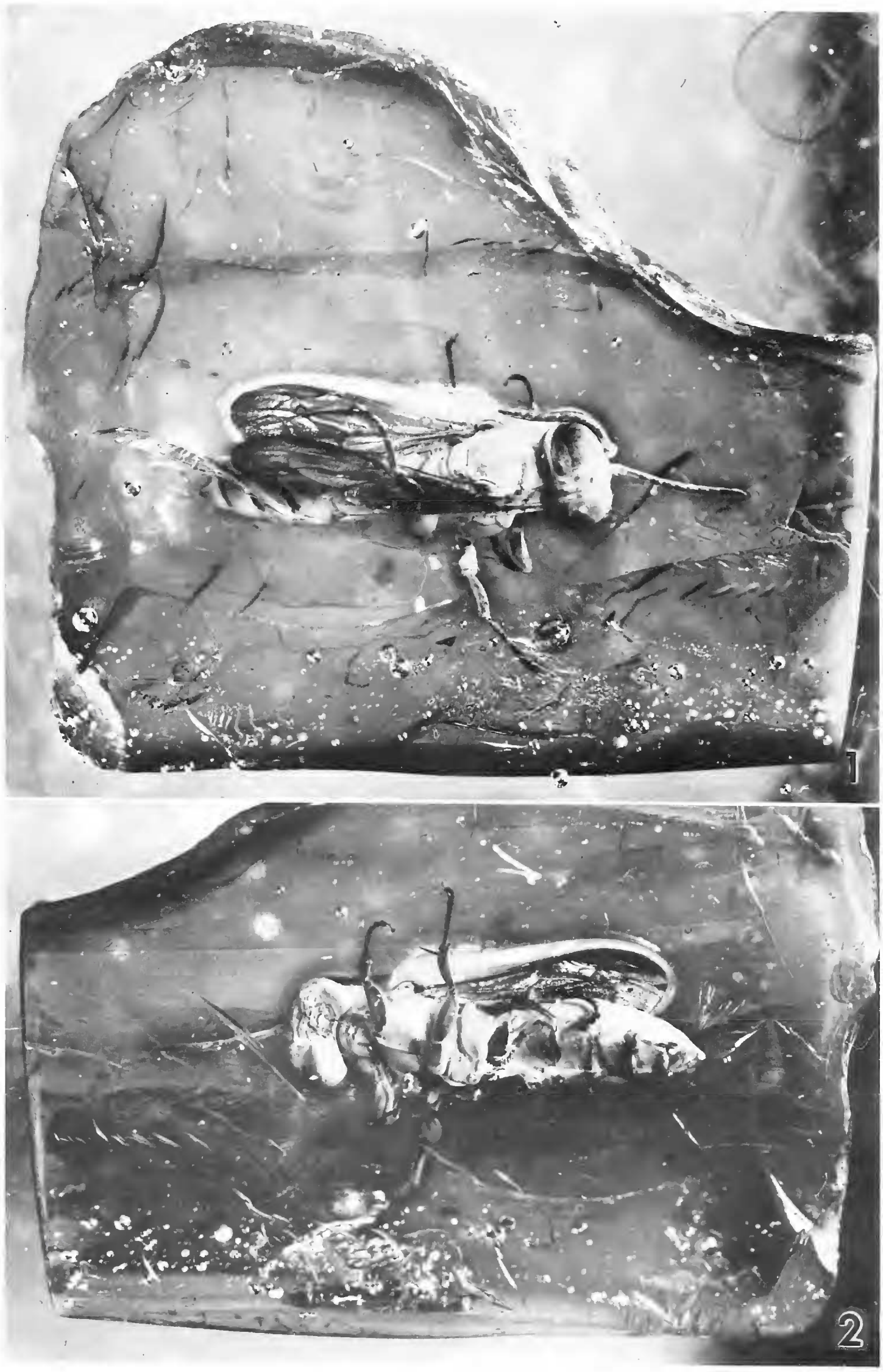
condylar ridge: extends distad from the mandibular condyle and constitutes the margin between the convex (external) and the concave (internal) mandibular faces; in *Pison,* it extends to less than mandibular midlength (the condylar ridge should not be confused with an additional ridge which we call admarginal ridge; the latter runs parallel to the posterior mandibular margin, comes in close contact with the condylar ridge, but does not continue to the mandibular base).

The specimen was examined under a stereomicroscope in a sugar solution rather than immersion oil in order to minimize the possibility of damage.

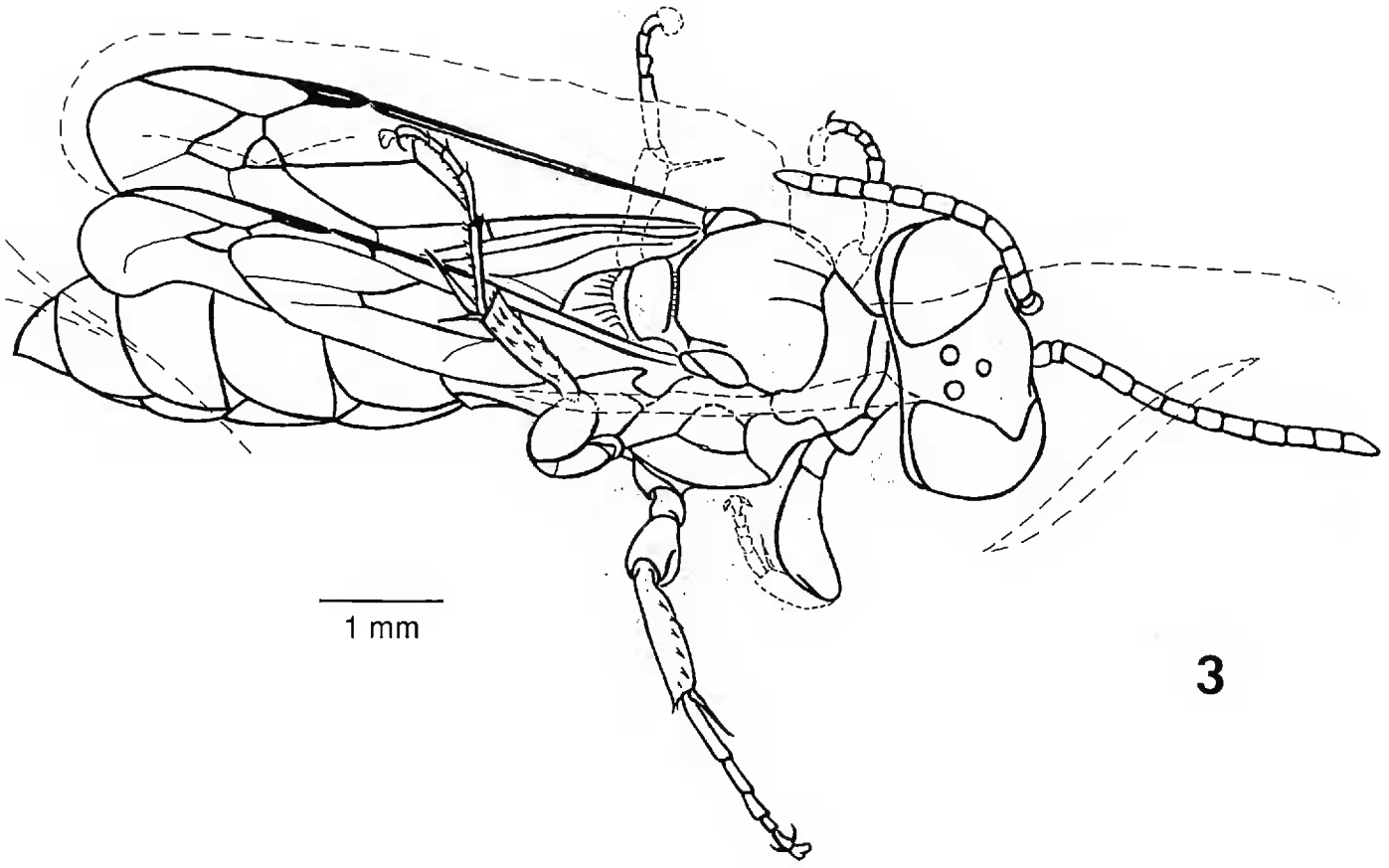
Pison electrum Antropov and Pulawski, NEW SPECIES
(Figs. 1–8)

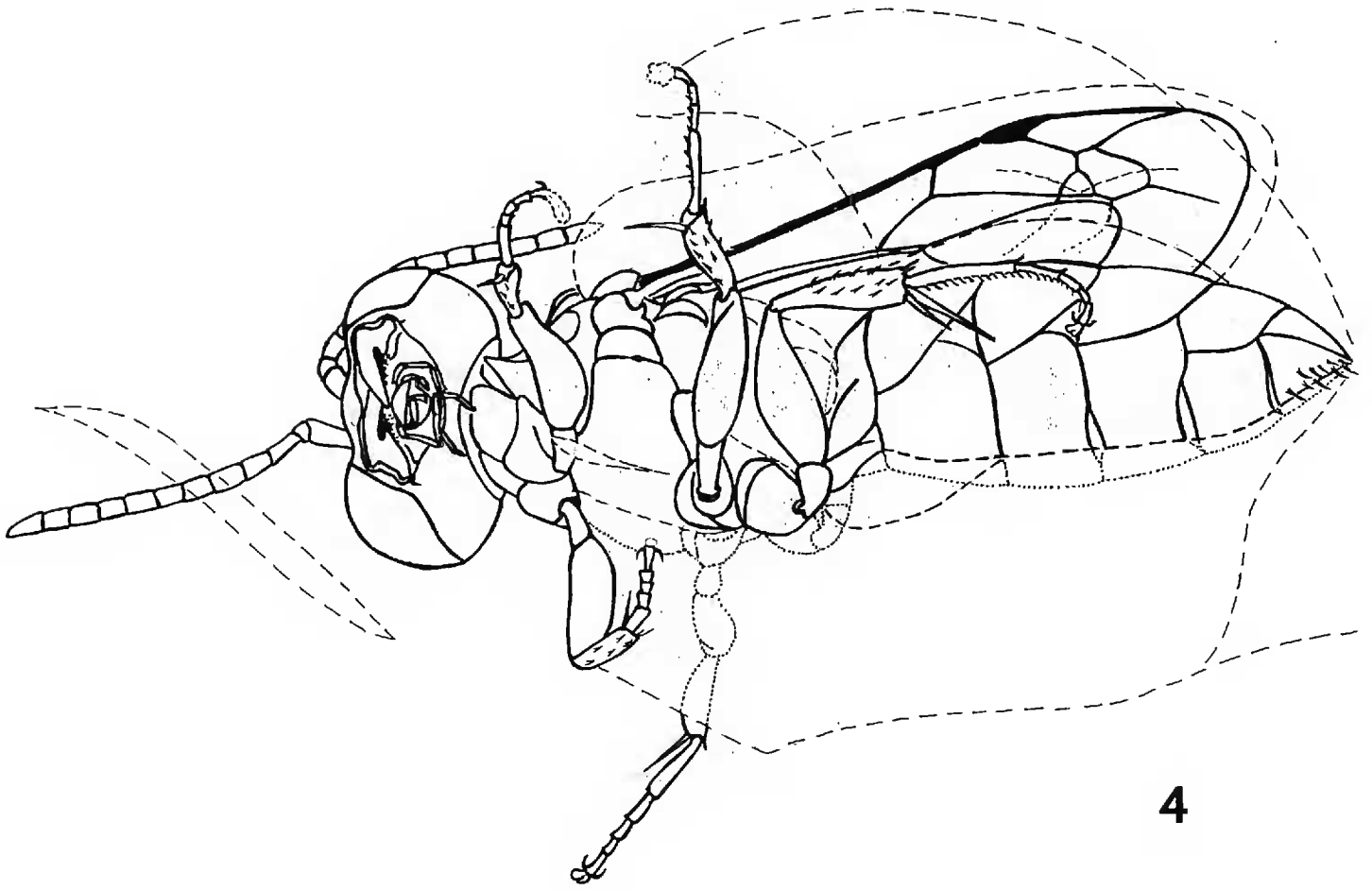
Derivation of name.—Electrum, Latin for amber, noun in apposition.

Material examined.—A superbly preserved specimen in Baltic amber from



Figures 1, 2. Photographs of amber sample. 1. Dorsally. 2. Ventrally.





Figures 3, 4. *Pison electrum,* drawings. 3. Dorsally. 4. Ventrally.

Hiddensee Island in the German Democratic Republic, a gift from Joachim Oehlke to Wojciech Pulawski circa 1975 (holotype, California Academy of Sciences, Entomology Type #16465).

Mineralogical analysis and age.—Using infrared analysis, S. Savkevich determined that the amber specimen was succinite, thus confirming its Baltic origin. Succinite is the commonest form of amber along the southern coast of Baltic and

western Frisean islands, extending west as far as Great Britain. Its age is Lower Eocene to Lower Oligocene, with most material believed to be Upper Eocene (e.g., Savkevich, 1970).

Generic characters.—The overall body shape, emarginate orbits, and wing venation indicate that the specimen is either a *Pison* or a *Pisonopsis,* but the acutely angulate marginal cell, absence of sternal graduli, and mandible noncarinate between the abductor swelling and apex of condylar ridge exclude the latter genus.

Comparison with fossil species.—Most taxonomically important characters (including the mandible) were not described in *oligocenum* and are not visible in the holotype of *cockerellae.* Although poorly preserved, the holotype of *cockerellae* clearly differs from *electrum* in having coarse, dense scutal punctures (punctures less than one diameter apart, puncture diameter about 0.3–0.5 × ocellar diameter) and the propodeal dorsum with many oblique ridges extending from the median carina. In *electrum,* the scutum is practically impunctate, and the propodeal dorsum has sparse ridges that extend obliquely from the base (ridges short except median carina long). In addition, the foremargin of the third submarginal cell equals 0.5 of the hindmargin in *electrum* but only 0.15 in *cockerellae* (however, the length of the foremargin is individually variable in extant species, and the difference is probably meaningless).

Both of Cockerell's descriptions (1908, 1909) of *oligocenum* seem totally inadequate at first, but one detail is significant. Cockerell notes that the "basal nervure falls about 100 μ short of transversomarginal," which we interpret as the forewing vein M being 100 μm closer to the wing base than crossvein cu-a (such a position is also found in some extant species, e.g., *esakii* Yasumatsu). In *electrum,* M diverges slightly distad of cu-a, a significant difference. Further differences (possibly individual rather than specific) can also be gleaned from the description. Expressed as a fraction of the marginal cell length, vein cu-a is 0.21 in *oligocenum* and 0.14 in *electrum,* the basal side of the first submarginal cell is 0.13 and 0.22, respectively, and the distance between 1r-m and 2m-cu is 0.05 and 0.12. Finally, the length of flagellomere X is 1.06 × length of flagellomere I in *oligocenum* and 0.87 in *electrum.*

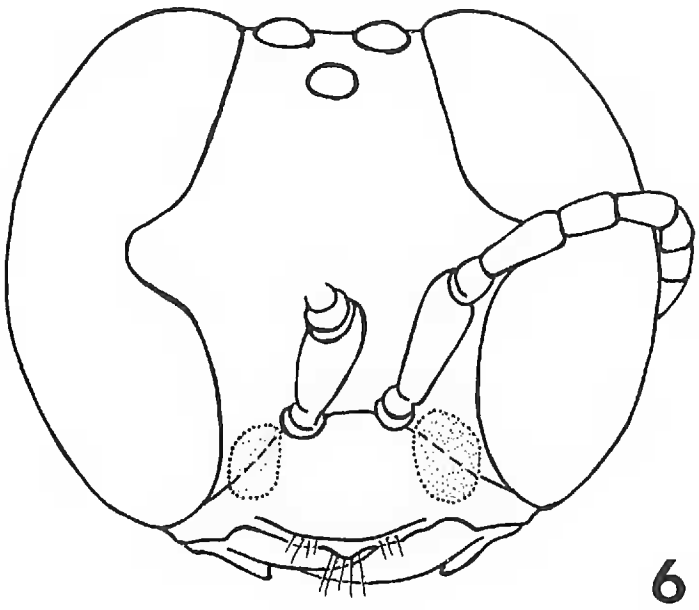
Comparison with extant species.—One striking feature of *Pison electrum* is the emarginate mandible (see Description for details). Mandibles are entire in most extant *Pison,* but the same shape as in *electrum* in two species groups from the Neotropical Region. Members of these groups have distinctive pronotal structures (Menke, 1988): either a polished, plate-like area anteromesally (*convexifrons* group) or the foremargin expanded into a free lamella (*pilosum* group). The anteromesal portion of the pronotum is hidden in *electrum,* but there is no free lamella like that found in the *pilosum* group. In addition, *electrum* departs from these Neotropical species in four other characters: clypeal lobe short (Fig. 6), clypeal setae short, propodeal dorsum obliquely ridged (except apically), and second recurrent vein ending on submarginal cell III (an arrangement also found in *cockerellae, oligocenum,* and some extant species such as *insigne* Sickmann). In the *convexifrons* and *pilosum* groups, the clypeal lobe is longer; the lower half of the clypeus has long, somewhat decumbent setae that project over clypeal margin to form a brush; the propodeal dorsum has punctures only or punctures plus a median carina or (*convexifrons* group) oblique carinae basally and transverse carinae apically; and the second recurrent vein ends on submarginal cell II (interstitial with

Figure 5. *Pison electrum,* photograph at a higher magnification.

1r-m in some members of the *convexifrons* group). Other distinctive features of *electrum* are: propodeal side not delimited dorsally by carina (carina present in *convexifrons* group), metapleural flange narrow (broad in *pilosum* group).

The mandible is somewhat similar in *Pison* n. sp., Pulawski, 1989, from Papua New Guinea, but in that species the distal end of the condylar ridge is rectangular, markedly less prominent than in *electrum* or the *convexifrons* and *pilosum* groups, and the adductor ridge is straight (not expanded) in the distal half. Consequently, the posterior mandibular margin is stepped rather than notched.

Description.—♀: Head nearly round in frontal view (Fig. 6), width 1.08× height. Labrum quadrangular, free margin entire. Posterior mandibular margin emarginate (Fig. 7), emargination contained between the prominent, acutely angulate apex of the condylar ridge and the roundly expanded distal portion of the adductor ridge; inner margin and posterior face hidden. Clypeal free margin arcuate, with obtuse median projection (Fig. 6). Occipital carina interrupted ventrally, separated from hypostomal carina by a distance equal to length of apical article of maxillary palpus. Frons without median sulcus, moderately convex beneath midocellus (as in most other *Pison*). Vertex slightly depressed, lower than top of eye. Eye asetose. Upper interocular distance 0.4× lower interocular distance. Ratio of hindocellar diameter, ocellocular distance, and interocellar distance = 1:0.2:0.8. Flagellomeres longer than wide; length of I 1.7× width, of X 2.0× width. Head with minute setae (length about ⅙ of hindocellar diameter) that emerge from microscopically fine punctures. Pronotal foremargin partly hidden but appearing modified; anteromesal portion with transverse pit that is margined behind by transverse ridge. Propleuron finely, uniformly punctate throughout. Pronotum, scutum, and scutellum with nearly contiguous micropunctures and semi-erect microsetae. Lateral margin of scutum with upturned flange along tegula. Scutellum with transverse, longitudinally crenulate sulcus basally. Mesopleuron and mesothoracic venter



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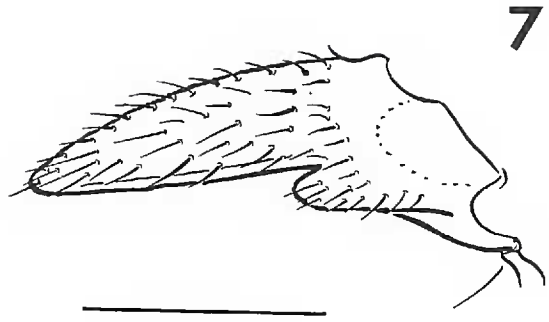
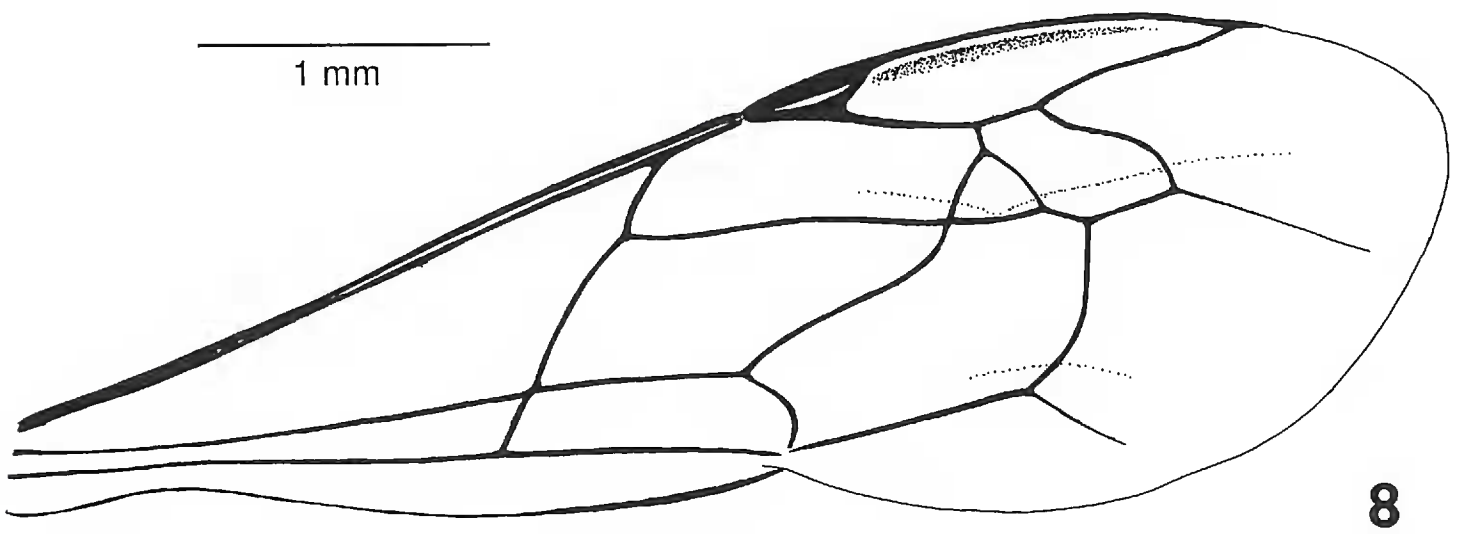


0.5 mm

7

1 mm



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1 mm

Figures 6–8. *Pison electrum,* drawings. 6. Head. 7. Mandible. 8. Forewing.

finely, evenly punctate (punctures about one diameter apart). Episternal sulcus incomplete, not reaching mesopleural foremargin. Metapleural flange narrower than ocellar diameter. Propodeum with no lateral carina or foveolate shelf between dorsum and side; dorsum with median carina and six to eight finer oblique ridges on each side; propodeal side shiny, punctures one to three diameters apart, dorsally and laterally with well-defined ridges; hindface not carinate. Tegula adjacent to scutum finely, densely punctate and with microscopic setae but impunctate on outer half. Forewing hyaline except infumate along foremargin, with three submarginal cells; media diverging from M + Cu slightly distad of crossvein cu-a; marginal cell acute apically, extending well beyond vein 2r-m, submarginal cell II petiolate, its height greater than petiole length; first recurrent vein interstitial with 1r-m; second recurrent vein received by submarginal cell III (at ⅓ of cell's length). Hamuli of hindwing divided into two groups (basal group of five or six hooks, distal group of six hooks). Legs of usual shape, finely setose. Hindcoxal dorsum without outer carina (inner carina concealed by femora on both legs). All tibiae with short, sparse spines on outer side (spines largest on hindtibia), and similar but finer spines present on tibial apex and tarsomeral venter. Tarsomeres

I–IV with one outer and one inner spine apically; spines short; tarsomeres II–IV with plantulae. Gaster sessile, not constricted between terga I and II, tergum I not humped posteriorly; pygidial plate absent; sternum I almost flat, not carinate laterally. Terga nonfasciate apically, with appressed, microscopic setae that emerge from fine, inconspicuous punctures (punctures dense, evenly spread). Sternal punctures larger, particularly on sterna V and VI apically; sterna II–V with apical row of long, sparse, erect setae, sternum VI with similar setae mesally and apically. Body length 9.3 mm (amber sample 18.3 × 16.2 × 6.0 mm). Body black, terga without yellow markings.

♂: Unknown.

Relationships.—Reconstructing the relationships of *electrum* to other *Pison* largely depends on how one interprets the notched mandibles in Trypoxylini. If the notch is ancestral, then *electrum* is close to the ancestral stock of *Pison.* If the notched mandible is derived, then the notch appears to be a synapomorphy linking *electrum* to the Neotropical *convexifrons* and *pilosum* groups. Yet *electrum* lacks the other apomorphies that define these groups (the lateral propodeal carina of the *convexifrons* group, the pronotal lamella of the *pilosum* group), and thus it cannot be placed in either. Possibly, the mandibular notch was acquired independently in several lineages of *Pison,* as the example of *nogorombu* seems to suggest.

Acknowledgments

We sincerely thank the following persons: Niles Eldredge (American Museum of Natural History, New York) who sent the holotype of *Pison cockerellae*; Arnold S. Menke (Systematic Entomology Laboratory, % Smithsonian Institution, Washington, D.C.) who made available his manuscript on New World *Pison,* provided specimens, and commented on our manuscript; Alexander P. Rasnitsyn (Paleontological Institute, Academy of Sciences of the U.S.S.R., Moscow) who helped in studying the specimen; Svyatoslav S. Savkevich (Leningrad Section, Oceanographic Institute, Academy of Sciences of the U.S.S.R.) who examined the infrared spectrum of the specimen; and Mary Ann Tenorio, Vincent F. Lee, and David L. Wagner who critically read the manuscript.

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